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Indian Standard

SPECIFICATION FOR POMFRET CANNED IN OIL

(First Revision)

UDC 664·951 : 639·228 POM

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

Price Rs 8·00 Gr 7

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Indian Standard
SPECIFICATION FOR POMFRET CANNED IN OIL
(First Revision)

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Indian Standard
SPECIFICATION FOR POMFRET CANNED IN OIL
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 11 November 1971, after the draft finalized by the Fish and Fisheries Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Pomfret is usually canned in oil. In order to ensure the quality and wholesomeness of the finished product, various physical, chemical, microbiological and hygienic requirements have been prescribed in this standard. The formulation of this standard was undertaken at the instance of the Development Council for Food Processing Industries.

0.3 This standard was first published in 1962. The various provisions of that standard have been under the review of the Sectional Committee from time to time and the present revision was taken up with a view to modifying the earlier requirements in the light of experience gained both by processors and users.

0.4 This revision incorporates a number of important modifications, namely: (a) head-space in cans has been deleted; (b) drained weight of the contents has been specified in terms of the net water capacity of the can, the method for which has been prescribed; and (c) method of test for microbiological activity has been simplified.

0.5 In the preparation of this standard, due consideration has been given to the provisions of the Prevention of Food Adulteration Act, 1954 and the Prevention of Food Adulteration Rules, 1955, Ministry of Health, Government of India. However, this standard is subject to the restrictions imposed under this Act, wherever applicable.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for white (*Stromateus cinerus*), silver (*Pampus argenteus*) and brown (*Parastromateus niger*) pomfrets canned in oil.

2. REQUIREMENTS

2.1 General

2.1.1 *Fish* — The pomfrets shall be of sound quality. The material to be canned shall be free from heads, tail-tips and entrails. Scales, if present, shall be removed from pomfrets before canning.

2.1.2 *Oil* — Only refined, pure clear and deodorized edible vegetable oil having characteristic colour shall be used for canning pomfret. The oil shall be free from any foreign matter or mineral oil and objectionable flavour and odour.

2.1.3 *Salt* — Edible salt preferably conforming to IS : 594-1962* shall be used for canning.

2.2 Freedom from Artificial Colouring Matter and Firming Agents — The product shall be free from artificial colouring matter and firming agents.

2.3 Additives — No additive other than common salt and species shall be used.

2.4 Hygienic Requirements — The material shall be prepared, filled and processed under hygienic conditions and only in premises maintained in a thoroughly clean and hygienic manner [*see* IS : 4303 (Part II)-1967†] and duly approved and licensed by the authorities concerned for fish products. The water used for processing of the fish shall be potable water, preferably conforming to IS : 4251-1967‡.

2.5 Material and Processing

2.5.1 The pomfrets, after nobbing, shall be thoroughly washed in potable water.

2.5.2 The material shall have a good odour and flavour, and retain a good colour characteristic of the species. The flesh shall be firm in texture and free from disintegration.

2.5.3 The pomfrets may be given a suitable brine treatment to ensure that the finished canned fish are firm in texture. Brine solutions shall be kept clean. The final saltiness of the pack shall be so adjusted as to produce a palatable product.

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*Specification for common salt for fish-curing (*revised*).

†Code for sanitary conditions, handling and transport in fish industry: Part II Sanitary conditions for fish processing units.

‡Quality tolerances for water for processed food industry.

2.5.4 *Processing* — Processing shall be at such temperature and for such length of time as will ensure thorough cooking and adequate sterilization of the finished product without burning, scorching or over-cooking. The water used for the cooling of cans shall be maintained in clean condition and chlorinated to maintain a minimum residual chlorine concentration of three parts per million.

2.6 Preparation — The pomfrets shall be cut to suitable thickness and pieces in any single can shall be of uniform size and of the same species. One tail piece may be included in each can provided the tail-tip is satisfactorily removed. The pieces shall be filled in the can in such a manner that they remain in the same axis, that is, there shall be no cross-filling.

2.6.1 *Packing in Cans* — The pieces shall be packed in suitable cans and hermetically sealed. If the cans are lacquered, the lacquer used shall be of such quality that it does not impart any foreign unpleasant taste and smell to the contents of the can and does not peel off during processing and storage of the product. The lacquer shall not be soluble in oil or brine to any extent. The cans shall show no evidence of rusting. The cans shall be thoroughly cleaned before filling.

2.6.1.1 The cans may also be lacquered externally subject to agreement between the purchaser and the manufacturer or the vendor.

2.6.1.2 *Cooking* — The pieces shall be cooked and drained properly.

2.7 Requirement for the Finished Product

2.7.1 The contents of the can on opening shall not display any appreciable disintegration and the oil shall be clear. Pieces from which portions have separated out would be treated as disintegrated units. The percentage of detached portions of fish, calculated on the basis of the drained weight, shall not exceed 5 percent based on the average of 5 cans.

2.7.2 The canned pomfret shall be of pleasant flavour characteristic of well-canned pomfret. It shall be free from scorched, bitter, foreign or other objectionable flavour. It shall have no colour other than the characteristic colour of well-preserved pomfret.

2.7.3 It shall be free from any foreign material and from grittiness.

2.7.4 The material shall be free from any type of poisonous and deleterious substances.

2.7.5 *Vacuum* — The can shall give a negative pressure when punctured. If round cans are used, the vacuum shall be not less than 100 mm.

2.7.6 *Drained Weight of the Contents* — The drained weight of the contents in each can shall be not less than 65 percent by weight of the water capacity of the can when tested by the method given in Appendix A.

2.7.6.1 The drained liquid shall not contain more than 10 percent by volume of water.

NOTE — The drained liquid (*see* **2.7.6**) shall be collected in a measuring cylinder and kept for separating the oil and water. The volumes of oil and water shall be measured and percentage of water determined.

2.7.7 The material shall also satisfy the limits for heavy metals and microbiological activity prescribed in Table 1.

TABLE 1 LIMITS FOR HEAVY METALS AND MICROBIOLOGICAL ACTIVITY FOR POMFRET CANNED IN OIL

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX)
(1)	(2)	(3)	(4)
i)	Arsenic, parts per million, *Max*	1	B
ii)	Lead, parts per million, *Max*	5	C
iii)	Copper, parts per million, *Max*	10	D
iv)	Zinc, parts per million, *Max*	50	E
v)	Tin, parts per million, *Max*	250	F
vi)	Microbiological activity	To satisfy the requirements of the test	G

3. PACKING AND MARKING

3.1 Packing — Unless agreed otherwise between the purchaser and the vendor, the cans shall be packed in cases sufficiently strong to withstand rough handling by rail, road and sea transport without damage to their contents.

3.2 Marking — The labelling of the cans may be done either by printing or lithographing on the cans themselves or by attaching labels printed on paper, subject to agreement between the purchaser and the vendor.

3.2.1 Each container shall be suitably marked with the following information:

a) Name of the material along with brand name, if any;
b) Name and address of the manufacturer;
c) Net weight of the contents of the can;
d) Drained weight of the contents of the can;
e) Batch or lot number and the date of manufacture;
f) The nature of the canning medium used and its ingredients;

g) Declaration to the effect that no artificial colouring matter has been used; and

h) Licence number, date and authority, if any, under which the manufacturer has been permitted to can the product.

3.2.2 The warranty period may also be mentioned subject to agreement between the purchaser and the vendor.

3.2.3 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material for testing conformity to this specification shall be drawn as prescribed in Appendix H.

5. TESTS

5.1 Tests shall be carried out as prescribed in **2.7.5**, **2.7.6** and the relevant appendices specified in col 4 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the experimental results.

APPENDIX A

(*Clause* 2.7.6)

DETERMINATION OF DRAINED WEIGHT

A-1. APPARATUS

A-1.1 IS Sieve 200 (Aperture 2·00 mm) — BS Sieve 8 or Tyler Sieve 9 or ASA Sieve 10 (same as ASTM Test Sieve) (*see* IS : 460-1962†), may also be used, if IS sieve is not available.

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*Specification for water, distilled quality (*revised*).

†Specification for test sieves (*revised*).

A-2. PROCEDURE

A-2.1 Carefully weigh the clean and dry sieve and transfer the contents of the can to the sieve. Allow to drain for five minutes and weigh the sieve with the contents. The difference between the two weights gives the drained weight. Calculate the drained weight as percentage of the water capacity of the can. Retain the residue on the sieve as well as the drained liquid.

A-2.2 Determine the water capacity of the can by the procedure given in **A-2.2.1** to **A-2.2.4**.

A-2.2.1 Cut out the lid without removing or altering the height of the double seam.

A-2.2.2 Wash, dry and weigh the empty can.

A-2.2.3 Fill the container with distilled water at 20°C to 4 mm vertical distance below the top level of the container and weigh.

A-2.2.4 Subtract the weight in **A-2.2.2** from the weight in **A-2.2.3**. The difference shall be considered to be the weight of water required to fill the container.

APPENDIX B

[*Table* 1, *Item* (i)]

DETERMINATION OF ARSENIC

B-1. METHODS

B-1.1 Any of the three methods, namely, Method 1 (*see* **B-2**), Method 2 (*see* **B-3**) and Method 3 (*see* **B-4**) may be used. Method 1 shall be the referee method in case of dispute.

B-2. METHOD 1

B-2.1 Apparatus

B-2.1.1 *Round-Bottom Flask* — of one litre capacity, with a long neck made of heat-resistant glass.

B-2.1.2 *Asbestos Pad* — with holes of 6 cm diameter.

B-2.1.3 *Kjeldahl Flask* — of 800 ml capacity.

B-2.1.4 *Spectrophotometer*

B-2.2 Reagents

B-2.2.1 *Sulphuric Acid* — analytical reagent grade (*see* IS : 266-1961*).

B-2.2.2 *Nitric Acid* — analytical reagent grade (*see* IS : 264-1968†).

B-2.2.3 *Ammonium Oxalate-Urea* — a saturated solution of ammonium oxalate containing 50 g of urea per litre.

B-2.2.4 *Sodium Chloride* — solid.

B-2.2.5 *Hydrazine Sulphate-Sodium Bromide Solution* — Dissolve 20 g of hydrazine sulphate and 20 g of sodium bromide in 1 litre of dilute hydrochloric acid (1 : 4).

B-2.2.6 *Ammonium Hydroxide Solution* — 50 percent (*v/v*).

B-2.2.7 *Phenolphthalein Indicator Solution* — 0·2 percent (*w/v*).

B-2.2.8 *Bromine Water* — saturated.

B-2.2.9 *Acid Molybdate Solution* — Dissolve 1 g of ammonium molybdate $(NH_4)_6Mo_7O_{24}.4H_2O$ in 100 ml of sulphuric acid (5 N).

B-2.2.10 *Hydrazine Sulphate Solution* — 0·15 percent, aqueous.

B-2.2.11 *Standard Arsenic Solution* — Dissolve 0·132 0 g of arsenic trioxide (As_2O_3) in about 3 ml of sodium hydroxide solution (1·0 N). Dilute with water, acidify with hydrochloric acid and make up the volume to 100 ml in a graduated flask. From this stock solution which contains 1·00 mg of arsenic per millilitre, prepare a standard solution containing 0·01 mg of arsenic per millilitre. Further dilutions may be prepared, if necessary.

B-2.3 Procedure

B-2.3.1 *Preparation of the Test Solution* — Dry about 100 g of the thoroughly blended and mixed contents of the can to a friable powder. Take 50 g of this moisture-free powder in the 1-litre flask. Add 25 ml of sulphuric acid and heat gently until properly charred. The charring should be done very carefully in the beginning, on the asbestos pad. Heating should be stopped whenever excess frothing starts. When the charring is complete, add 15 ml of nitric acid and heat gently until the initial foaming subsides and the contents of the flask are reduced to a brown-coloured liquid mass. Adjust a 50-ml burette containing nitric acid at the mouth of the flask and regulate the flow in such a way that not more than 15 drops per minute are delivered, while the contents of the flask are continuously boiling. Continue boiling until the contents of the flask are clear and colourless and fumes of sulphur trioxide are evolved, indicating that all organic matter has been destroyed.

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*Specification for sulphuric acid (*revised*).

†Specification for nitric acid (*first revision*).

Cool slightly and add 25 ml of the ammonium oxalate-urea solution and heat again until the fumes of sulphur trioxide appear so as to ensure that all oxides of nitrogen are expelled. Cool, dilute with water to the mark in a 500-ml graduated flask. Utilize suitable aliquot for the determination of arsenic and retain the rest for the determination of lead, copper, zinc and tin.

B-2.3.2 Take a suitable aliquot in the Kjeldahl flask, add 50 ml of water, 10 g of sodium chloride and 25 ml of the hydrazine sulphate-sodium bromide solution. Connect the flask with a distilling tube and heat over a small well-protected flame and distil into 25 ml of water contained in a receiving flask. Heating is necessary not to boil the solution but to evolve hydrochloric acid gas for carrying over the arsenic trichloride formed. The absorption of the hydrochloric acid gas by the water increases its temperature. Adjust the flame so that the temperature of the distillate rises to 90°C in about 11 minutes and then discontinue the distillation.

B-2.3.3 Neutralize accurately the solution in the receiving flask with the ammonia solution using phenolphthalein as indicator. Add 50 ml of water and add bromine water in small quantities until the solution becomes distinct yellow. Place a funnel over the flask and boil the solution thoroughly until all the free bromine has been expelled. Make up the volume to 100 ml with water. Transfer 25 ml of the solution to a 50-ml graduated flask. Dilute 10 ml of the acid-molybdate solution to 90 ml with water, add 1 ml of the hydrazine sulphate solution, make the volume to 100 ml and mix. Add 10 ml of this solution to the solution contained in the 50-ml graduated flask and place in a water-bath for 10 minutes. Cool, make up the volume and read the colour in the spectrophotometer at 700 μ wavelength. Compare against a standard curve prepared from the standard arsenic solution.

B-3. METHOD 2 (SANDELL MERCURIC-PERMANGANATE PROCEDURE)

B-3.1 Apparatus

B-3.1.1 The apparatus is assembled as shown in Fig. 1 and consists of a 250-ml Erlenmeyer flask *A* fitted to a condenser *B* which is connected by means of a delivery tube *C* to a 15-ml absorption tube *D*. The neck of the tubular of the condenser contains a wad of lead acetate paper and glass wool *E* and the delivery tube contains two plugs of glass wool *F*, dipped in a solution of lead acetate.

B-3.1.2 *Photo-Electric Colorimeter or Spectrophotometer*

B-3.2 Reagents

B-3.2.1 *Hydrochloric Acid* — analytical reagent grade (*see* IS : 265-1962*).

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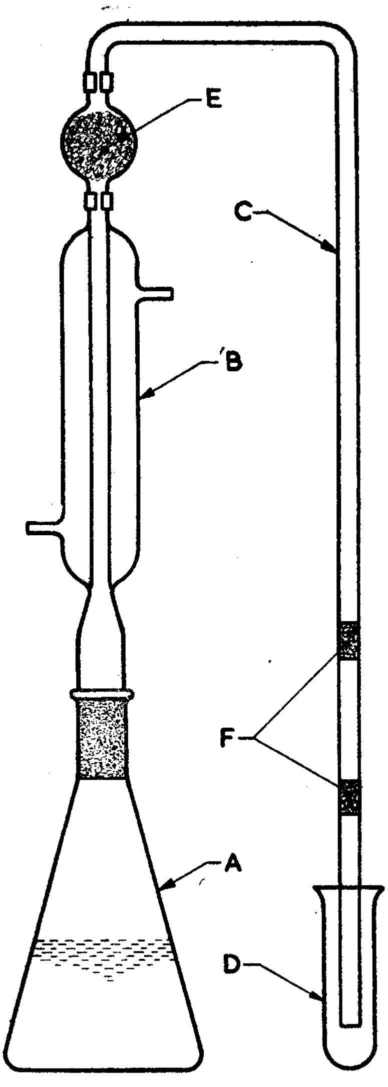
*Specification for hydrochloric acid (*revised*).



A — Reaction vessel (250 ml)
B — Condenser
C — Delivery tube
D — Absorption tube
E — Wad of lead acetate paper/glass wool
F — Glass wool plugs dipped in lead acetate solution

FIG. 1 ASSEMBLY OF APPARATUS FOR THE DETERMINATION OF ARSENIC BY THE SANDELL-MERCURIC PERMANGANATE PROCEDURE

B-3.2.2 *Potassium Iodide Solution* — 15 percent (*w/v*), aqueous.

B-3.2.3 *Stannous Chloride Solution* — Dissolve 40 g of stannous chloride ($SnCl_2 . 2H_2O$) in 100 ml of hydrochloric acid.

B-3.2.4 *Sulphuric Acid* — 6 N.

B-3.2.5 *Mercuric Chloride Solution*

B-3.2.6 *Potassium Permanganate Solution* — prepared by dissolving 0·1 g of potassium permanganate in 100 ml of water. Discard when a precipitate of manganese dioxide (MnO_2) forms.

B-3.2.7 *Zinc* — arsenic-free.

B-3.2.8 *Molybdate-Hydrazine Reagent*

Solution A — Dissolve 1 g of ammonium molybdate [$(NH_4)_6 Mo_7O_{24} . 4H_2O$] in 10 ml of water and add 90 ml of sulphuric acid (6 N).

Solution B — Dissolve 0·15 g of hydrazine sulphate in 100 ml of water.

Mix 10 ml each of the solution *A* and *B* and dilute to 100 ml.

B-3.2.9 *Standard Arsenic Solution* — Dissolve 0·132 0 g of arsenic trioxide (As_2O_3) in about 3 ml of sodium hydroxide solution (1·0 N). Dilute with water, acidify with hydrochloric acid and make up the volume to 100 ml in a graduated flask. From this stock solution which contains 1·00 mg of arsenic per millilitre, prepare a standard solution containing 0·01 mg of arsenic per millilitre.

B-3.3 Procedure

B-3.3.1 Take a 25-ml of aliquot of the test solution (*see* **B-2.3.1**) in the 250-ml flask. Add 5 ml of hydrochloric acid, 2 ml of the potassium iodide solution and 0·5 ml of the stannous chloride solution. Allow to stand for about 20 minutes to facilitate the conversion of pentavelent arsenic to trivalent arsenic. This reduction may also be achieved by heating the solution to a temperature between 80 and 90°C, maintaining at this temperature for 15 minutes and then cooling to room temperature. To the absorption tube, add 0·2 ml of the sulphuric acid, 1 ml of mercuric chloride solution and 0·25 ml of the potassium permanganate solution. Mix with a thin glass rod and lower the delivery tube into the absorption tube so that its tip nearly touches the surface of the solution in the absorption tube. Add the zinc to the 250-ml flask and lower the delivery tube so that it nearly touches the bottom of the absorption tube. Allow the gas to bubble through the liquid in the absorption tube gently at the rate of 25 to 30 bubbles per minute. The solution should still contain excess of potassium permanganate. Ignore any turbidity due to hydrated manganese dioxide that forms when more than 10 mg of arsenic is present.

B-3.3.2 When all the arsenic has passed over, disconnect the delivery tube, leave it in the absorption tube, add 5 ml of the molybdate-hydrazine reagent and heat in a water-bath for 15 minutes at 95 to 100°C. Cool and transfer to a 25-ml graduated flask. Make up the volume and filter through glass wool or through sintered glass funnel. Determine the transmittancy in a photo-electric colorimeter or a spectrophotometer. In the former case, use a red filter showing maximum transmission at 700 μ. Conduct a blank. Since the solution obeys Beer's Law, construct a standard curve using varying quantities of the standard arsenic solution and calculate the amount of arsenic in the test solution. From this, calculate the amount of arsenic in the sample.

B-4. METHOD 3 (GUTZEIT METHOD)

B-4.1 Apparatus — Assemble the apparatus shown in Fig. 2 as follows :

> Take a 60-ml wide-mouth bottle. Equip it by means of a perforated stopper with a glass tube *A*, measuring 120 × 10 mm with a constriction at a distance of 50 mm from the upper end. Place a small wad of glass wool in the constricted bottom end of the tube and add about 4 g of clean dry sand. Moisten the sand with lead acetate solution (10 percent *w/v*) and remove the excess by light suction. Place dry lead acetate paper in the lower portion of the tube for the removal of hydrogen sulphide. Connect the tube by means of a rubber stopper with a narrow glass tube B, measuring 100 × 2·7 mm with a constriction at a distance of 60 mm from the upper end. Place in this tube the strip of mercuric bromide paper (*see* **B-4.2.1**).

B-4.2 Reagents

B-4.2.1 *Mercuric Bromide Paper* — Prepare by cutting filter paper similar to Whatman No. 40, into strips 2·5 mm wide and 120 mm long and soaking the strips for one hour in a fresh 5-percent solution of mercuric bromide in 95 percent ethyl alcohol. Dry and store in a dark bottle covered outside with black paper. Use the strips as soon as possible.

B-4.2.2 *Concentrated Hydrochloric Acid* — *see* IS : 265-1962*.

B-4.2.3 *Potassium Iodide Solution* — 15 percent *w/v*.

B-4.2.4 *Stannous Chloride Solution* — Dissolve 40 g of arsenic-free stannous chloride ($SnCl_2.2H_2O$) in hydrochloric acid and make up the volume to 100 ml with hydrochloric acid.

B-4.2.5 *Granulated Zinc* — arsenic-free.

B-4.2.6 *Standard Stock Solution of Arsenic* — Dissolve 1·320 g of arsenic trioxide (As_2O_3) in 25 ml of sodium hydroxide solution (20 percent *w/v*).

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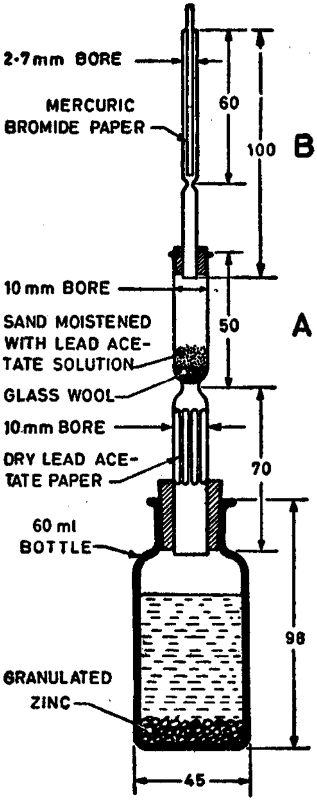
*Specification for hydrochloric acid (*revised*).



All dimensions in millimetres.

FIG. 2 APPARATUS FOR THE DETERMINATION OF ARSENIC

Saturate the solution with carbon dioxide and dilute to 1 000 ml with recently boiled water. One millilitre of this solution contains 1 mg of arsenic.

B-4.2.7 *Standard Dilute Solution of Arsenic* — Dilute 40 ml of the stock solution (*see* **B-4.2.6**) to 1 000 ml. Mix thoroughly. Take 50 ml of the diluted solution and dilute it further to 1 000 ml. This solution contains 0·002 mg of arsenic per millilitre. Use this solution for the preparation of standard stains (*see* **B-4.3.2**). This solution should be prepared fresh before use.

B-4.3 Procedure

B-4.3.1 Place an aliquot of the sample (not exceeding 30 ml) estimated to contain 0·01 to 0·03 mg of arsenic in the Gutzeit bottle. Add sufficient hydrochloric acid so as to have a total volume of 5 ml of hydrochloric acid in the aliquot. Cool, if necessary, and add 5 ml of the potassium iodide solution and 4 drops of the stannous chloride solution. Add 2 to 5 g of the granulated zinc, put in the strip of the mercuric bromode paper in the narrow tube and immerse the whole apparatus in a water-bath kept at 20 to 25°C to within 2·5 cm of the top of the narrow tube for 1·5 hours.

B-4.3.2 Remove the strips and average the length of the stains on both side in millimetres. Locate the length of the unknown on a standard graph and read the quantity of arsenic present from the abscissa. The graph is prepared by running known quantities of the standard arsenic solution (*see* **B-4.2.7**) by the above method using the length of the stain as ordinate and milligrams of arsenic as abscissa. Simultaneously carry out a blank determination.

B-4.4 Calculate the quantity of arsenic present in the material in parts per million.

APPENDIX C

[*Table* 1, *Item* (ii)]

DETERMINATION OF LEAD

C-1. REAGENTS

C-1.1 Citric Acid — solid.

C-1.2 Ammonium Hydroxide Solution — sp gr 0·90 or diluted as required.

C-1.3 Potassium Cyanide Solution — 10 percent (*w/v*).

C-1.4 Dithizone (Diphenylthiocarbazone) Solution — 0·1 percent (*w/v*) in chloroform, freshly prepared.

C-1.5 Dilute Hydrochloric Acid — 0·1 N.

C-1.6 Standard Lead Solution — Two reference solutions of lead nitrate are required in this test as given under **C-1.6.1** and **C-1.6.2**.

C-1.6.1 *Standard Strong Lead Solution* — obtained by dissolving 0·160 0 g of lead nitrate [$Pb(NO_3)_2$] in 50 ml of dilute nitric acid and making up the volume in a 100-ml graduated flask.

C-1.6.2 *Standard Dilute Lead Solution* — freshly prepared before the test by diluting 1 ml of the standard strong lead solution to 100 ml with water in a graduated flask.

C-1.7 Ammonium Acetate — solid.

C-1.8 Sodium Sulphide Solution — 10 percent (*w/v*).

C-2. PROCEDURE

C-2.1 Take a suitable aliquot of the solution (*see* **B-2.3.1**), add 2 g of citric acid and just neutralize with ammonia. Add 1 ml of the potassium cyanide solution and transfer the whole to a separating funnel. Extract the liquid with the dithizone solution. Carry out 3 extractions, using 10 ml for the first extraction and 5 ml each for the subsequent extractions. If the last extraction gives any indication of a reddish tinge, extract again to ensure complete removal of lead.

C-2.2 Take 10 ml of water in another separating funnel and wash each extract with this water. If suspended matter is present in the chloroform extract, this shall be filtered before passing to the separating funnel containing the 10 ml of wash water. Transfer the combined chloroform extracts to a separating funnel and extract lead by shaking successively with 50 ml, 20 ml and 10 ml of dilute hydrochloric acid. Combine the acid extracts in a separating funnel wash once or twice with 10 ml of chloroform and filter through a previously wetted filter paper into a 100-ml graduated flask. Make up the volume of the filtrate to 100 ml with dilute hydrochloric acid and use this as the test solution.

C-2.3 Estimate colorimetrically the lead present by comparison with the standard dilute lead solution containing 0·000 01 g of lead per millilitre (using not more than 10 ml of the standard solution for matching) in the following manner:

> Transfer a suitable volume of the test solution to a Nessler cylinder. Add 2 g of ammonium acetate, followed by ammonia until just alkaline and then 1 ml of potassium cyanide solution. Dilute to 50 ml, add 2 drops of sodium sulphide solution and match the colour against a set of standards prepared in the same way.

C-2.4 A blank determination shall be run under the same conditions, on the same reagents and by the same person but without using the material.

APPENDIX D

[*Table* 1, *Item* (iii)]

DETERMINATION OF COPPER

D-1. METHODS

D-1.1 Either Method 1 (*see* **D-2**) or Method 2 (*see* **D-3**) may be used. Method 1 shall be the referee method in case of dispute.

D-2. METHOD 1

D-2.1 Apparatus

D-2.1.1 *Spectrophotometer*

D-2.2 Reagents

D-2.2.1 *Citric Acid* — solid.

D-2.2.2 *Ammonium Hydroxide Solution* — sp gr 0·90.

D-2.2.3 *Sodium Diethyldithiocarbamate Solution* — 0·1 percent (*w/v*).

D-2.2.4 *Carbon Tetrachloride* — redistilled.

D-2.2.5 *Sodium Sulphate* — anhydrous.

D-2.2.6 *Dilute Nitric Acid* — concentrated nitric acid of sp gr 1·42 diluted with an equal volume of water.

D-2.2.7 *Standard Copper Solution* — Weigh accurately 0·100 0 g of pure copper turnings, carefully dissolve in the minimum amount of nitric acid, cool, and dilute to 1 litre in a graduated flask. Pipette 10 ml of this solution into a 100-ml graduated flask and dilute to the mark. This solution contains 10 µg of copper per millilitre.

D-2.3 Procedure

D-2.3.1 Transfer a 10-ml aliquot of the test solution (*see* **B-2.3.1**) to a separating funnel. Add 1 g of citric acid and dissolve it by shaking. Make the solution alkaline to litmus by adding ammonium hydroxide solution in small quantities. Add 5 ml of the sodium diethyldithiocarbamate solution, shake thoroughly and extract with 5-ml portions of carbon tetrachloride until the final extract is colourless. Dry the combined extracts by shaking thoroughly with anhydrous sodium sulphate. Filter the dry extract and wash the filter paper with carbon tetrachloride. Make up the volume of the filtrate to 25 ml with carbon tetrachloride and measure the absorption at 437 µ by means of the spectrophotometer. Simultaneously carry out blank determinations on the water and the reagents.

D-2.3.2 Prepare a series of standards by treating aliquots of the standard copper solution (*see* **D-2.2.7**) in the same manner as the test solution. From the absorption of the standard solutions, prepare a standard curve plotting absorption values against concentration. From the curve, obtain the weight of copper present in the test solution.

D-3. METHOD 2

D-3.1 Reagents

D-3.1.1 *Citric Acid* — solid.

D-3.1.2 *Ammonium Hydroxide Solution* — sp gr 0·90.

D-3.1.3 *Concentrated Hydrochloric Acid* — *See* IS : 265-1962*.

D-3.1.4 *Dithizone* (*Diphenylthiocarbazone*) *Solution* — 0·1 percent (*w/v*) in chloroform.

D-3.1.5 *Concentrated Nitric Acid* — *See* IS : 264-1968†.

D-3.1.6 *Concentrated Sulphuric Acid* — *See* IS : 266-1961‡.

D-3.1.7 *Citric Acid Solution* — 5 percent (*w/v*) aqueous.

D-3.1.8 *Gum Arabic Solution* — 1 percent (*w/v*).

D-3.1.9 *Sodium Diethyldithiocarbamate Solution* — 0·2 percent (*w/v*) aqueous, freshly prepared.

D-3.1.10 *Standard Strong Solution of Copper* — Dissolve 0·392 5 g of pure crystallized copper sulphate ($CuSO_4,5H_2O$) in water and make up the volume to 100 ml. This solution contains 1 mg of copper per millilitre.

D-3.1.11 *Standard Dilute Solution of Copper* — Dilute 1 ml of the standard strong solution (*see* **D-3.1.10**) to 100 ml in a graduated flask. One millilitre of this solution contains 0·01 mg of copper.

D-3.2 Procedure

D-3.2.1 Take a suitable aliquot of the test solution (*see* **B-2.3.1**) and add 2 g of citric acid. Neutralize exactly with ammonium hydroxide solution using a piece of litmus paper and acidify with 1 ml of concentrated hydrochloric acid. Cool and transfer into a separating funnel. The total volume of the solution should be about 100 ml.

D-3.2.2 Extract the copper by shaking with three successive portions of 5 ml of the dithizone solution, shaking thoroughly for a minute for each extraction. Separate the dithizone solution layers and wash the combined dithizone extracts with about 10 ml of water. Transfer the dithizone extract into a tube of heat-resistant glass and evaporate the chloroform on a water-bath.

D-3.2.3 Heat the copper-dithizone residue in the test tube with one millilitre of concentrated sulphuric acid and a little nitric acid until all organic matter is destroyed. Add 5 ml of water and re-heat to fuming stage. Cool, dilute with water and transfer the whole of the solution or a measured volume of the solution depending upon the quantity of copper present, into a Nessler cylinder. Add 1 ml of the citric acid solution, 4 ml of the ammonium

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*Specification for hydrochloric acid (*revised*).

†Specification for nitric acid (*first revision*).

‡Specification for sulphuric acid (*revised*).

hydroxide solution followed by 5 ml of the gum arabic solution and make up the volume to 50 ml with water. Add 5 ml of sodium diethyldithiocarbamate solution and match the colour by adding the standard copper solution (*see* **D-3.1.11**) to a control cylinder containing the same quantities of reagents as present in the test solution. Calculate the copper content of the material in parts per million from the known volume of the standard copper solution required for matching.

APPENDIX E

[*Table* 1, *Item* (iv)]

DETERMINATION OF ZINC

E-1. APPARATUS

E-1.1 Spectrophotometer

E-2. REAGENTS

E-2.1 Methyl Red Indicator Solution — 1 percent (*w/v*) aqueous.

E-2.2 Copper Sulphate Solution — Dissolve 8 g of copper sulphate ($CuSO_4$, $5H_2O$) in water and dilute to one litre. One millilitre of this solution contains 2 mg of copper.

E-2.3 Ammonium Hydroxide Solution — redistilled, sp gr 0·90.

E-2.4 Concentrated Hydrochloric Acid — sp gr 1·16.

E-2.5 Hydrogen Sulphide Gas — passed through a wash bottle containing water.

E-2.6 Dilute Hydrochloric Acid — 5 percent (*w/w*).

E-2.7 Bromine Water — saturated.

E-2.8 Phenol Red Indicator Solution — 0·04 percent (*w/v*). Dissolve 0·1 g of phenol red in 28·2 ml of 0·01 N sodium hydroxide and dilute to 250 ml with water.

E-2.9 Hydrochloric Acid (1 : 1) — Dilute concentrated hydrochloric acid with an equal volume of water.

E-2.10 Ammonium Citrate Solution — Dissolve 225 g of ammonium citrate in water, make alkaline to phenol red with ammonium hydroxide and add 75 ml in excess. Dilute to 2 litres. Extract this solution immediately before use as follows:

> Add to the solution a slight excess of dithizone solution and extract with carbon tetrachloride until the solvent layer is clear bright-green. Remove the excess of dithizone by repeated extraction with chloroform and finally extract once more with carbon tetrachloride. (It is essential that excess dithizone be entirely removed, otherwise zinc will be lost during the elimination of cobalt and nickel.).

E-2.11 Dimethylglyoxime Solution — Dissolve 2 g of dimethylglyoxime in 10 ml of ammonium hydroxide solution and 200 to 300 ml of water, filter and dilute to 1 litre.

E-2.12 α-Nitroso-β-Naphthol Solution — Dissolve 0·25 g of α-nitroso-β-naphthol in chloroform and dilute to 500 ml with chloroform.

E-2.13 Chloroform — redistilled.

E-2.14 Dithizone (Diphenylthiocarbazone) Solution — Dissolve 0·05 g of dithizone in 2 ml of ammonium hydroxide solution and 100 ml of water and extract repeatedly with carbon tetrachloride until the solvent layer is clear bright-green in colour. Discard the solvent layer and filter the aqueous portion through a washed ashless filter paper. (This solution is best prepared as needed since it is only moderately stable even when kept in the dark and under refrigeration).

E-2.15 Carbon Tetrachloride — redistilled.

E-2.16 Hydrochloric Acid — 0·04 N.

E-2.17 Stock Solution of Zinc — Dissolve exactly 0·500 g of pure granulated zinc in slight excess of dilute hydrochloric acid and dilute to 1 litre in a graduated flask.

E-2.18 Standard Solution of Zinc — At the time of the experiment, dilute 10 ml of the stock solution of zinc (*see* **E-2.17**) to 1 000 ml with hydrochloric acid (0·04 N). This solution contains 5 µg of zinc per millilitre.

E-3. PROCEDURE

E-3.1 Separation of Sulphide Group — Take a suitable aliquot of the test solution (*see* **B-2.3.1**) estimated to contain 25 to 100 µg of zinc, add 2 drops of methyl red indicator solution, 1 ml of copper sulphate solution and neutralize with ammonium hydroxide solution. Add sufficient quantity of concentrated hydrochloric acid to make the solution about 0·15 N with respect to this acid (about 0·75 ml excess in 50 ml of solution is satisfactory). The *p*H of the solution at this point should be 1·9 to 2·1 when measured with a glass electrode. Pass a stream of hydrogen sulphide gas into the solution until precipitation is complete. Filter the contents of the flask through a fine textured filter paper (Whatman No. 42 or its equivalent) that has been previously fitted into the funnel and washed first with dilute hydrochloric acid and then with water. Collect the filtrate in a beaker and wash the flask and the filter with 3 to 4 small portions of water. Boil the filtrate gently until the odour of hydrogen sulphide is no longer detected then add 5 ml of bromine water and continue boiling until bromine has been expelled. Allow the solution to cool, neutralize with ammonium hydroxide solution using phenol red as indicator and then make it slightly acidic with hydrochloric acid (1 : 1) by adding an excess of 0·2 ml. Dilute the resultant solution in a graduated flask to contain 0·2 to 1·0 µg of zinc per millilitre.

E-3.2 Elimination of Nickel and Cobalt — Transfer a 20-ml aliquot of the solution (obtained under **E-3.1**) into a separating funnel. Add to it 5 ml of ammonium citrate solution, 2 ml of dimethylglyoxime solution and 10 ml of α-nitroso-β-naphthol solution and shake the contents of the funnel for two minutes. Discard the lower layer and extract the aqueous layer with 10 ml of chloroform to remove residual α-nitroso-β-naphthol. Discard the chloroform layer.

E-3.3 Isolation and Estimation of Zinc

E-3.3.1 To the aqueous layer obtained after eliminating nickel and cobalt (*see* **E-3.2**) which at this point has a *p*H of 8·0 to 8·2, add 2·0 ml of the dithizone solution and 10 ml of carbon tetrachloride, and shake for 2 minutes. Allow the layers to separate and remove the aqueous layer as completely as possible, withdrawing it by means of a pipette attached to the vacuum line. Wash down the sides of the separating funnel with about 25 ml of water and draw off the aqueous layer without shaking. Add 25 ml of hydrochloric acid (0·04 N) to the carbon tetrachloride layer in the separating funnel and shake for 1 minute to transfer the zinc to the acid-aqueous layer. Drain off and discard the carbon tetrachloride layer taking care to dislodge and remove the drop that usually floats on the surface. To the acid aqueous layer, add 5·0 ml of ammonium citrate solution and 10·0 ml of carbon tetrachloride (*p*H of the solution at this point is 8·8 to 9·0). Determine the volume of the dithizone solution to be added as given in **E-3.3.1.1**.

E-3.3.1.1 Pipette 4·0 ml of the standard solution of zinc into a separating funnel, add to it 21 ml of hydrochloric acid (0·04 N) from a burette, 5 ml of ammonium citrate solution, 10·0 ml of carbon tetrachloride and then add the dithizone solution in 0·1 ml increments, shaking briefly after each addition until a faint yellow colour in the aqueous layer indicates a bare excess of the reagent. Note the total volume of the dithizone solution added. Multiply this volume by 1·5.

E-3.3.2 Add the volume (calculated under **E-3.3.1**) of the dithizone solution to the solution contained in the separating funnel (*see* **E-3.3.1**) and shake it for 2 minutes. Pipette 5·0 ml of the carbon tetrachloride layer and transfer it to the spectrophotometer cell. Dilute the solution with 10·0 ml of carbon tetrachloride, mix and determine its transmission at 540 µ.

E-3.3.2.1 Dilution may be made in a clean dry test tube if the design of the cell does not permit direct mixing.

E-3.3.3 Pipette into a series of separating funnels 0, 1, 2, 3 and 4 ml of the standard solution of zinc and add the necessary volume of hydrochloric acid (0·04 N) to make 25 ml. Add into each separator 5·0 ml of the ammonium citrate solution and the calculated volume of the dithizone solution. Shake the separating funnels for two minutes. From the first separating funnel, pipette out 5·0 ml of the carbon tetrachloride layer and transfer it to the spectrophotometer cell. Dilute the solution with 10·0 ml of carbon tetrachloride, mix and determine its transmission at 540 μ. Proceed in the same manner with the solutions contained in other separating funnels.

E-3.3.4 Plot the transmittance for each of the series of separating funnels on logarithmic scale against concentration of zinc in micrograms present in 25 ml of the diluted standard zinc solution in the particular separating funnel and draw a smooth curve through the points. (Intercept of this curve may vary from day to day depending on the actual concentration of dithizone used in the final extraction, but the slope of the curve should remain essentially the same.) From this curve, obtain the weight of zinc in micrograms.

APPENDIX F

[*Table* 1, *Item* (v)]

DETERMINATION OF TIN

F-1. REAGENTS

F-1.1 Ammonium Hydroxide Solution — sp gr 0·90.

F-1.2 Concentrated Hydrochloric Acid — sp gr 1·16.

F-1.3 Dilute Sulphuric Acid — 1 : 3 (*v/v*).

F-1.4 Hydrogen Sulphide Gas — passed through a wash bottle containing water.

F-1.5 Wash Solution — Mix 100 ml of saturated ammonium acetate solution with 50 ml of glacial acetic acid and 850 ml of water.

F-1.6 Ammonium Polysulphide Solution — Pass hydrogen sulphide gas through 200 ml of ammonium hydroxide solution contained in a bottle immersed in ice-cold water until no more gas is absorbed, add 200 ml of the ammonium hydroxide solution and dilute with water to make 1 000 ml. Add 25 g of flowers of sulphur to this solution and keep for several hours to digest the sulphur and then filter. Use the filtrate.

F-1.7 Dilute Acetic Acid — Dilute one volume of glacial acetic acid with 9 volumes of water.

F-2. PROCEDURE

F-2.1 Take a suitable aliquot of the test solution (*see* **B-2.3.1**), dilute to 400 ml, cool and add ammonium hydroxide solution until the contents are alkaline. Add 20 ml of either concentrated hydrochloric acid or dilute sulphuric acid. Cover the beaker with a watch glass. Heat the solution to about 95°C and pass a slow stream of hydrogen sulphide gas through it for one hour. Digest the mixture at 95°C for one hour and allow it to stand for another 30 minutes. Filter the contents of the beaker through a quantitative filter paper and wash the residue of stannous sulphide on the filter, alternately with three portions each of wash solution and hot water. Transfer the residue along with the filter paper to a 50-ml beaker, add 10 to 20 ml of the ammonium polysulphide solution, heat to boiling and filter by decantation. Add 10 ml of the ammonium polysulphide solution, boil and filter again. Repeat this once more and finally wash the filter paper with hot water. Acidify the combined filtrate and washings with dilute acetic acid, gently boil for one hour and allow to stand overnight. Filter the resulting mixture through a double 11-cm ashless filter paper. Wash the filter paper alternately with two portions each of the wash solution and hot water. Transfer the residue along with the filter paper to a tared porcelain crucible and dry it thoroughly in an air-oven. Carefully ignite the filter paper, using a Bunsen flame and incinerate the contents to convert the sulphide to oxide. Partly cover the crucible and heat strongly over a Bunsen or Meker burner. (The sulphide shall be gently roasted to the oxide which may then be heated to a high temperature without loss by volatilization.)

F-2.2 Cool the crucible in a desiccator and weigh as oxide (SnO_2). Repeat the process of heating, cooling and weighing till the difference between two successive weighings is less than 1 mg. Note the lowest weight. Obtain the weight of metallic tin from the weight of tin oxide (SnO_2) by using the factor 0·787 7.

APPENDIX G

[*Table* 1, *Item* (vi)]

TEST FOR MICROBIOLOGICAL ACTIVITY

G-1. GENERAL

G-1.1 Incubation at 37°C — Half of the cans selected as in **H-2.5** shall be incubated at 37°C for not less than 14 days and subjected to bacteriological examination.

G-1.2 Incubation at 55°C — The remaining half of the cans shall be incubated at 55°C for not less than 4 days and subjected to bacteriological examination.

G-2. APPARATUS

G-2.1 Glassware — All the glass apparatus used in the microbiological examination shall be sterile.

G-2.2 Accessories — Can opener of the piercing type, sampling petri-dishes, pipettes, scissors, cotton wool — all sterile. Suitable detergent for washing the cans, and rectified spirit.

G-3. MEDIA

G-3.1 Sodium Thioglycollate Broth — It has the following composition:

Dextrose	5 g
Yeast extract	5 g
Peptone	15 g
Sodium chloride	2·5 g
1 Cystine	0·75 g
Sodium thioglycollate	0·4 g
Agar-agar	0·75 g
Resazurin	0·001 g
Distilled water	1 000 ml

G-3.1.1 *Preparation* — Dissolve all the ingredients except resazurin in the distilled water by heating on water-bath, adjust *p*H to 7·3 filter, add the resazuring, distribute in 10 ml quantities in test tubes and sterilize at 1 kg/cm^2 steam pressure for 30 minutes. Warm the tubes to 80°C for 30 minutes and immediately cool them prior to use.

G-3.2 Tryptone Glucose Agar with 0·5 Percent Sodium Chloride — It has the following composition:

Beef extract	3 g
Tryptone	5 g
Dextrose	1 g
Agar-agar	15 g
Sodium chloride	5 g
Distilled water	1 000 ml

G-3.2.1 *Preparation* — Melt the agar with the other ingredients by steaming. Adjust *p*H to 7·3, filter through cotton wool, distribute in convenient quantities and sterilize at 1 kg/cm^2 steam pressure for 30 minutes. The medium is melted by heating on water-bath and cooled to 40°C just before use.

G-3.3 Sulphite Polymyxin Sulphadiazine Agar (SPS Agar)— It has the following composition:

Bacto tryptone	15 g
Bacto yeast extract	10 g
Bacto agar	15 g
Ferric citrate	0·5 g
Distilled water	1 000 ml

G-3.3.1 *Preparation* — Dissolve the ingredients by steaming. Adjust the *p*H to 7·0 ± 0·1, filter and distribute in flasks in convenient quantities. Sterilize at 121°C for 15 minutes. The medium is melted and cooled to 40°C just before use. To each litre of the cooled medium add:

a) 5·0 ml of freshly prepared 10 percent solution of sodium sulphite ($Na_2SO_3 . 7H_2O$)

b) 10·0 ml of 0·1 percent solution of polymyxin B sulphate, only sterile distilled water to be used for making solutions.

G-3.4 Normal Saline — 0·9 percent (*w/v*) of sodium chloride (analytical reagent). Distribute in 90 ml quantities and sterilize at 1 kg/cm² steam pressure.

G-4. PROCEDURE

G-4.1 Preparation of the Cans for Test — Allow the incubated cans to cool down to room temperature. Clean the top surface of the cans with a detergent like soap water, wash them well and dry with cotton wool. Sterilize the dried surface by sprinkling rectified spirit and flaming.

G-4.2 Opening of the Cans

G-4.2.1 *Unswelled Cans* — Cut open the sterilized side of the can with a sterile can opener.

G-4.2.2 *Swelled Cans* — Place a sterilized glass funnel over the sterilized side of the can. Introduce a sharp and sterilized metal rod through the tail end of the funnel and pierce the can. After the pressure is released cut open the can with a sterile can opener.

G-5. PROCEDURE

G-5.1 Commercial Sterility Test — With a sterile pipette, transfer aseptically 1 ml of the liquid portion from the can to the thioglycollate broth and incubate the tube at 37°C for 48 hours. If there is growth in the tubes after 48 hours, the cans are not commercially sterile. In doubtful cases the contents of the tube may be reinoculated and tested for a period of 48 hours. No cans shall show non-sterile conditions.

G-5.2 Total Aerobic Plate Count — Transfer aseptically 10 g of the solid portion from the centre of the can into a sterile petri dish. Prepare a homogenate of the material with 90 ml of the normal saline under asceptic conditions. Transfer 1 ml each of the homogenate to two sterile petri dishes. Add nearly 10 ml of the melted and cooled agar, mix well and incubate the dishes at 37°C for 48 hours, after the agar has solidified. Count the number of colonies and compute the number of organisms per gram. Not less than 90 percent of the samples shall be sterile, no sample shall have bacterial count above 100/g.

G-5.3 Examination for Clostridia — One millilitre of the liquid portion **(G-5.1)** is transferred to sodium thioglycollate broth **(G-3.1)** using sterile pipette and incubated at room temperature for 2 days. Positive tubes may be tested for clostridia using SPS Agar **(G-3.3)** as given in **G-5.3.1**.

G-5.3.1 One millilitre of the inoculam from sodium thioglycollate broth is mixed with approximately 10 ml of SPS agar, allowed to solidify in the petri dish and the plate is incubated at room temperature for 2 to 4 days, under anaeorbic conditions using spray's dish or keeping the plate in an enclosed atmosphere consisting of 80 percent nitrogen and 20 percent carbon dioxide. Black colonies show the presence of *clostridium* spp.

APPENDIX H

(*Clause* 4.1)

SAMPLING OF POMFRET CANNED IN OIL

H-1. GENERAL REQUIREMENTS OF SAMPLING

H-1.1 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

H-1.2 Samples may be tested at a laboratory agreed to between the purchaser and the vendor.

H-2. SCALE OF SAMPLING

H-2.1 Lot — In any consignment, all the cases containing cans of the same size and from the same batch of manufacture shall be grouped together to constitute a lot.

H-2.1.1 Samples shall be tested for each lot for ascertaining conformity of the material to the requirements of this specification.

H-2.2 The number of cases to be selected from each lot shall be in accordance with col 1 and 2 of Table 2.

TABLE 2 SELECTION OF PACKING CASES

(*Clause* H-2.2)

No. of Cases in the Lot (1)	No. of Cases to be Selected (2)
Up to 8	2
9 „ 25	4
26 „ 40	5
41 „ 65	6
66 „ 110	7
111 „ 180	8
181 „ 300	9
301 „ 500	10

H-2.3 The cases shall be selected at random. In order to ensure randomness of selection, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

> Starting from any case count them as 1, 2, 3,.........r and so on in a systematic manner. Every rth case thus counted shall be withdrawn, r being the integral part of N/n, where N is the total number of cases in the lot, and n the number of cases to be selected, till the requisite number is obtained.

H-2.4 From each of the cases selected as in **H-2.2**, draw at random one can for testing the physical and chemical requirements.

H-2.5 In addition to the cans selected as in **H-2.4**, 8 cans shall be selected at random as far as possible from all the cases chosen (*see* **H-2.2**), for testing for microbiological activity.

H-3. NUMBER OF TESTS

H-3.1 Each of the cans selected as in **H-2.4** for testing the physical and chemical requirements shall be tested for vacuum.

H-3.2 After testing for vacuum the contents of all the cans shall be taken and mixed together to form a composite sample. The composite sample so formed shall be tested for heavy metals (*see* Appendices B, C, D, E and F).

H-3.3 Tests for Microbiological Activity

H-3.3.1 *Incubation at 37°C* — All the cans selected (*see* **H-2.5**) for testing the microbiological activity, shall be incubated at 37°C for not less than 14 days and subjected to microbiological examination (*see* Appendix G).

H-4. CRITERIA FOR CONFORMITY

H-4.0 The lot shall be considered as conforming to the requirements of this specification if the criteria mentioned under **H-4.1** to **H-4.3** are all satisfied.

H-4.1 For Physical Requirements — The lot shall be declared as conforming to the physical requirements of vacuum if all the individual samples tested (*see* **H-3.1**) satisfy the requirements specified in **2.7.5**.

H-4.2 For Chemical Requirements — For declaring the conformity of the lot to the chemical requirements regarding heavy metals, the test results on the composite sample (*see* **H-3.2**) shall satisfy the relevant requirements specified in **2.7.7**.

H-4.3 For Microbiological Activity — For declaring the conformity of the lot to microbiological activity the test results (*see* **H-3.3.1**) shall satisfy the requirements specified in **2.7.7**.

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

INDIAN STANDARDS

Over 6 500 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Agricultural and Food Products Group fall under the following categories:

Abattoir
Alcoholic drinks
Animal feeds
Animal housing and equipment
Bakery and confectionery
Bee-keeping equipment
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